DEPARTMENT OF
AGRICULTURE AND INTELLIGENCE
OF SOUTH AUSTRALIA.

BULLETIN No. 28.

NOXIOUS WEEDS.

REPRINTED FROM *The Journal of Agriculture of S.A.*,
OCTOBER, 1907.

ADELAIDE:
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Department of Agriculture and Intelligence,

Adelaide, December 2, 1907.

The necessity of exterminating, or at least keeping in check, the proclaimed noxious weeds in this State, is of sufficient importance to warrant the issue of the accompanying article as Bulletin No. 28 of this Department. The article was prepared by the officers of the Department of Agriculture, and was first published in the journal of the Department. Each noxious weed is illustrated in order to facilitate identification. An introduction on "How to Eradicate Noxious Weeds" is contributed by Mr. M. Holtze, Director, Botanic Garden.

WILLIAM ANGUS,

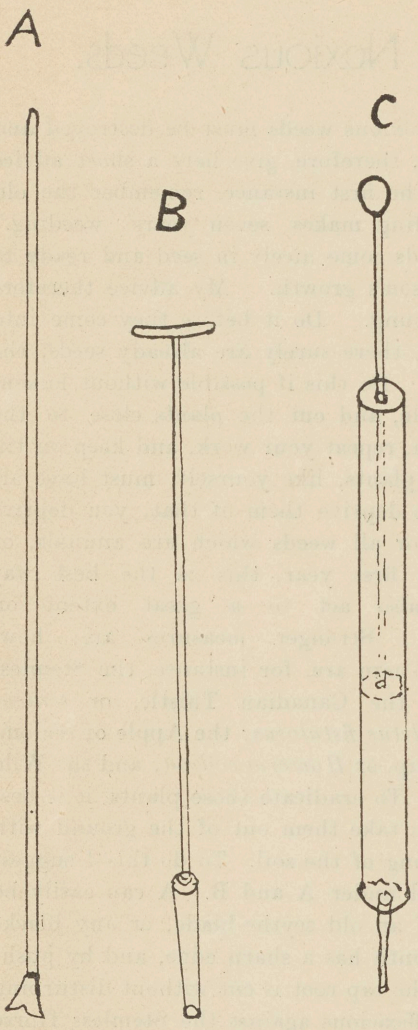
Director, Department of Agriculture and Intelligence.

Contents.

How to Eradicate Noxious Weeds.

The order has been given that noxious weeds must be destroyed and the Act vigorously enforced. I will, therefore, give here a short advice how best to eradicate weeds. In the first instance, remember the old and true saying, "One year's seeding makes seven years' weeding." Never, therefore, wait till your weeds come nicely in seed and ready to disseminate themselves for next season's growth. My advice therefore is: Destroy weeds while they are young. Do it before they come into flower, for when you see the flowers, there surely are already seeds, the flowers of which you did not notice. Do this if possible without loosening the soil. Use a scythe or sickle, and cut the plants close to the ground. When they come up again, repeat your work, and keep on till the plants sicken of it and die, for plants, like yourself, must have air and light, and if you by any means deprive them of that, you deprive them of their means of living. For all weeds which are annuals, or plants which flower and seed the first year, this is the best way to destroy them, and it will also act to a great extent on others, which are not annuals. Stronger measures are, however, required to deal with them. There are, for instance, the Stemless Horse Thistle, or *Cirsium acaule;* the Canadian Thistle, or *Cnicus arvensis;* the Wild Onion, or *Asphodelus fistulosus;* the Apple of Sodom, or *Solanum sodomœum;* the Cape Tulip, or *Homeria collina;* and the Wild Cotton, or *Gomphocarpus fruticosus.* To eradicate those plants, it is best to cut them below the ground, or to take them out of the ground with their tap-roots, without much loosening of the soil. To do this I suggest the use of two instruments, depicted under A and B. A can easily be made on the farm out of a piece of an old scythe-blade, or any blacksmith will cheaply make it. The mouth has a sharp edge, and by pushing it under the plant to eradicate, the tap-root is cut without disturbing the soil. This instrument is most efficacious against the Stemless Horse Thistle, the Canadian Horse Thistle, the Wild Onion, the Apple of Sodom, and the Wild Cotton. In the case of the Cape Tulip and also the Wild Onion, I would, however, recommend the use of instrument B, which is made out of sheet-iron, in the shape of a big cheese-scoop, such as is used to test cheeses. The scoop would be about 9 inches long, with a bottom diameter of about 1½ inches, tapering up to 2 inches, and the handle the height of a walking-stick. It is placed over the plant to be taken out, pushed into the ground, and by a sharp twist the tap-root is broken and the plant taken out of the ground. This instrument

is used in Europe to clear lawns of dandelion roots. Those two instruments can only be used where the ground is not too strong, and, while the soil is moist enough to admit the instrument easily and while the tap-root is yet fleshy and easily cut or broken. Of all the proscribed plants the Cape Tulip, I consider, is the worst to eradicate, for it propagates itself not only by the bulbs and seeds, but also by means of bulbils contained in large numbers in sheets surrounding the flower-stem. Persistent mowing may, after all, prove the cheapest, and it will be a hard struggle for those landholders who have neglected to destroy the plant while it was yet not so plentiful; but each year's delay will make it worse, and the plant is decidedly deadly to grazing animals, and a decided effort should be made to eradicate it. Another instrument which in many cases may prove useful is the poison-squirt, C. This is a large syringe, the height of a walking-stick, and not too capacious to make it too heavy when filled. This is filled with any liquid weed-killer—arsenic, or bluestone, or crude kerosine. A man walks over the field, places the poison-squirt into the heart of a plant, and squirts a small quantity of the liquid into it. By this means many hundreds of plants can be killed in a day without much interfering with the surrounding vegetation. Only, don't forget that poison is poison to beasts as well as to plants, and therefore use no poison where animals have access to it. To recapitulate, my advice is: Destroy the plants early, the earlier the better, but in any case before the plants come into bloom. Disturb the soil as little as possible, and persist in your work till you have succeeded.



M. HOLTZE,
Director, Botanic Garden,
Adelaide.

Noxious Weeds.

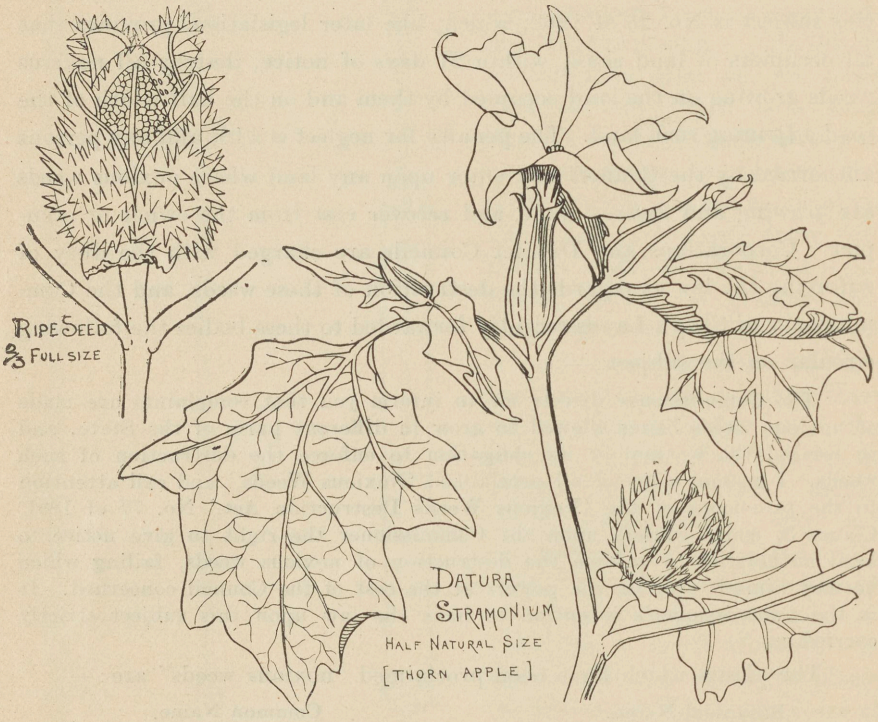
The increasing prevalence of noxious weeds, and the indifference shown by some landholders in respect to their destruction, have caused the Government to direct the attention of the local authorities to the duty imposed on them by law to compel landholders to keep their land and adjoining roads free from noxious weeds. The first Act that relates to this subject is No. 26 of 1862, which, like later legislation, provides that all occupiers of land shall, within 21 days of notice, destroy all noxious weeds growing on the land occupied by them and on the half-width of the road adjoining such land. The penalty for neglect is £10, and any persons authorized by the Council may enter upon any land where noxious weeds are growing and destroy same, and recover cost from the owner or occupier. Corporations and District Councils are charged with the duty of enforcing the law as regards the destruction of these weeds, and the Commissioner of Crown Lands recently forwarded to these bodies the following circular on the subject:—

"The Commissioner directs me to inform you that complaints are made of noxious weeds being allowed to grow in different parts of the State, and to remind the Council of its obligation to enforce the destruction of such weeds. I enclose a list of all proclaimed 'Noxious Weeds,' and call attention to the provisions of the 'Noxious Weeds Destruction Act,' No. 77 of 1891, Clause 3, which confers upon the Commissioner the right to give notice to local authorities to enforce the destruction of noxious weeds, failing which he may himself exercise the powers at the cost of the Council concerned. It is the Commissioner's intention to have the law upon this subject strictly carried out."

The plants which have been proclaimed "noxious weeds" are:—

Botanical Name.	Common Name.
Centaurea calcitrapa	True Star Thistle.
Centaurea solstitialis	Yellow Star Thistle, or Long-stem Thistle.
Kentrophyllum lanatum ...	Commonly called Star Thistle.
Cirsium acaule	Stemless Horse Thistle.
Asphodelus fistulosus	Asphodel, or Wild Onion.
Cnicus arvensis	Canadian Thistle.
Datura stramonium	Thorn Apple, or Mad Apple.
Solanum sodomæum	Apple of Sodom.
Homeria collina	Cape Tulip.
Xanthium spinosum	Bathurst Burr.
Gomphocarpus fruticosus ...	Wild Cotton.
Euphorbia lathyris	False Caper.
Also for City of Adelaide only—	
Chenopodium album	Goose-footed White Saltbush.

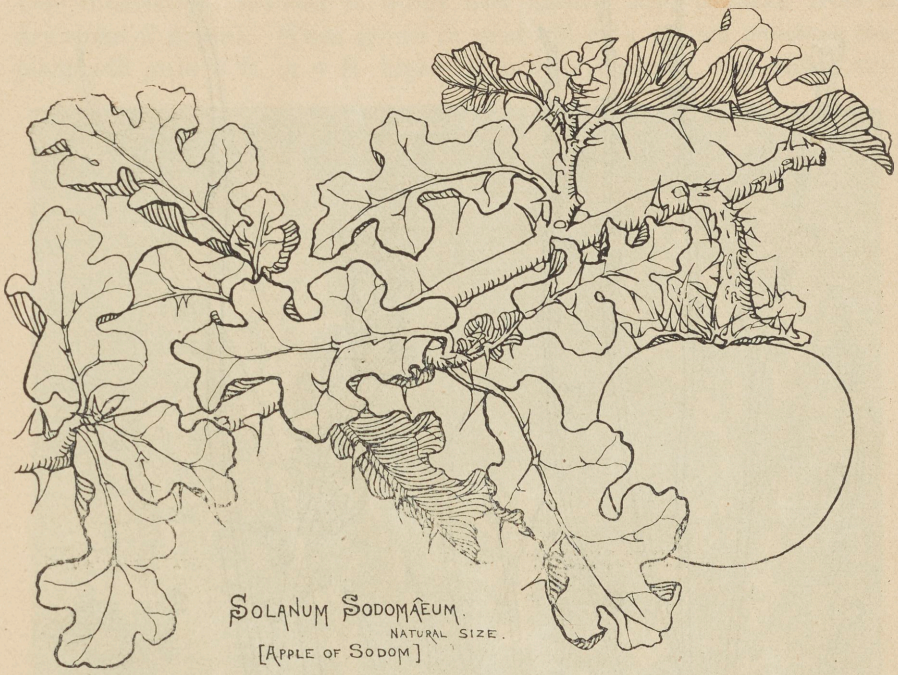
DATURA STRAMONIUM is commonly called "Thorn Apple," "Mad Apple," "Devil's Trumpet," "Devil's Apple," "Stramonium," and by some other names. It is very poisonous both in foliage and seeds, and has caused the deaths of stock at different times. In common with several other poisonous plants, *Datura* is used in medical practice with beneficial effect, but is extremely dangerous when administered without an exact knowledge of its poisonous nature. The flowers are white, with a very slight greenish tinge on the lower portion of the tube. The plant is of a succu-



lent nature, with green woody stem, many bunches; leaves are dull green, paler beneath, with undulating margin, deeply and irregularly indented, forming irregular teeth. The fruit- or seed-pod is egg-shaped, about 2 in. long, and covered with stout spines.

SOLANUM SODOMÆUM.—This is called "Apple of Sodom," is a perennial shrub, growing from 2 ft. to 3 ft. high, with strong spines both on leaves and stems; the leaves are sinuate or waved on edges, rather crinkled, and bright green; flowers are violet, with bright yellow stamens —like the flower of a potato; the berries or fruits are bright lemon-yellow, and hang on the plant until they shrivel and change to a dirty parchment colour. The seeds are very numerous. The illustration is natural

size. This plant is generally reputed to be poisonous, and is undoubtedly objectionable on account of its thorny nature and of its taking possession of the land when once it has gained a footing.



ASPHODELUS FISTULOSUS.—The name commonly given to this plant is "Wild Onion," because the leaves, especially of the young plant, resemble those of a clump of eschallots in every way. The plant takes entire possession of the land wherever it obtains a footing, and no animal is known to eat it. At the base of the leaves, near the roots, they are enveloped with a silvery-white membranous substance. The flowers are white, six-petalled, with a faint reddish flush over the petals, and down the centre is a pinkish-carmine stripe. Seedpods are globular, generally very numerous, and provided with many seeds. The roots are thick and fleshy, of a dirty-yellowish colour, and the plants keep green all the year through.

KENTROPHYLLUM LANATUM (SAFFRON THISTLE).—This weed first appeared in the South-East, near Naracoorte, and was at first called erroneously "Star Thistle" (a name applying generally to the Centaureas, but more particularly to *C. calcitrapa)*. For a time it has also been wrongly named "Barnaby Thistle," a cognomen which properly belongs to the so-called "Yellow Star Thistle" *(Centaurea solstitialis)*. The popular name of "Saffron Thistle," applied to *Kentrophyllum lanatum*, is derived from its slight resemblance in form of flowers to the "False Saffron" *(Carthamus tinctorius)*. *Kentrophyllum lanatum* has been declared a noxious weed, and is without doubt a most objectionable plant, and displacing plants of much greater nutritive value which would otherwise occupy

ASPHODELUS FISTULOSUS. [WILD ONION]
HALF NATURAL SIZE.

A. LEAVES.
B. FLOWERS.
C. SEED STEM.
D. YOUNG PLANT

the same land. In times of great scarcity of feed live-stock will eat this thistle, and when they have become accustomed to it, will even browse upon it when other vegetation is available. Our illustration, reduced to about half natural size, is taken from a dry spike of flowers. When grown in good soil with enough moisture the plant will grow 3 ft. or 4 ft. high. It is very vigorous, but under un-

"KENTROPHYLLUM LANATUM"—SAFFRON THISTLE.

favourable circumstances the whole plant will be dwarfed. It sometimes lasts through the second year. The upper branches and leaves are slightly woolly. The leaves are bright green and somewhat irregular, the lower ones being larger than the upper, are "crinkled," and have sharp spines on the points along their edges. They are strongly veined, the bottom leaves having stalks, but these become shorter towards the upper part of

the plant, until the bases of the leaves clasp the branches. The centre of the flower is intensely yellow, and the bracts surrounding each are bright green, with a number of sharp spines along the edges.

CENTAUREA CALCITRAPA (STAR THISTLE).—The name "Star Thistle" applies equally to all members of the Centaurea genus, but has been adopted in Australasia for the particular species, *C. calcitrapa*.

"CENTAUREA CALCITRAPA"—STAR THISTLE

The name, "*calcitrapa*," is derived from a supposed resemblance of the flower-head to the calcitrop (a metal ball with sharp spikes inserted in such a way that one point was always on top), used by the

Roman soldiers to throw in the way of cavalry horses when charging. The spines of the Star Thistle are long, strong, sharp, and bone-white, and the flower is purple-pink. When young, the plant is somewhat

"Centaurea solstitialis"—Yellow Star Thistle.

dense, and dark sage-green, and takes possession of the land, especially for a year or two after a cereal crop has been cultivated. When full-

grown the leaves are lighter-green in colour and partially divided. Cross-bred sheep will eat the young plants when there is little else for them; but when it begins to flower it is from 18 in. to 30 in. high, much branched, and too harsh and prickly for any animal, and very few animals care to walk across a field of star thistle in flower. Being a summer annual, it can be destroyed by ploughing under in late spring, when the condition of the soil will allow; but it is often the case that the ground is too hard and dry at this time, and, if allowed to go to seed, the seeds are carried over the country by the wind. The presence of this weed, or of its near relative, *C. solstitialis*, will greatly diminish the value of land, and decrease the yield of any crop sown upon it.

CENTAUREA SOLSTITIALIS (YELLOW STAR THISTLE).—This is also called St. Barnaby's Thistle. It is not as tall or strong as the *C. calcitrapa*. It is upright and lightly branched. The upper or stem leaves are not divided, but the lower leaves are divided. The spines on the flower-head are flattened, with short prickles on each edge and a longer one on the end, all of a reddish colour. This is also an annual, and in many respects like *C. calcitrapa*.

CNICUS ARVENSIS (CANADA THISTLE).—This plant is known in England as the "Meadow Thistle," "Corn Thistle," and "Green Thistle." In America and Canada it is called "Canada Thistle" and "Cursed Thistle." In Australia it is known as "Canada Thistle." Wherever it gets a hold it is truly a curse upon the owner of the land. Its roots ramify in every direction, from near the surface and deeply down, and at very short intervals they send up stems, so that the whole field becomes matted with the leaves and stems, which are thickly covered with short, sharp, thorns. Large areas of land in New Zealand, Tasmania, and Victoria are dominated by this weed, and everywhere it is most difficult to exterminate. It grows from 2 ft. to 5 ft. high, according to the soil and climate. The leaves are from 4 in. to 6 in. long, winged at the base, deeply lobed, the edges armed with numerous short, sharp, stiff spines. Stems branched and leafy, with flower-heads in small clusters at ends of branches nearly an inch long, with compact involucre, the small scales having thorny points. In most cases the male flowers are on one plant and the females on another; but in rare cases both sexes may be found on one plant. It seeds freely where male and female flowers exist near each other. Where only one male or one female plant is growing, it generally spreads rapidly in a circular patch by means of its creeping roots. There have been two or three such patches near Mount Gambier, which have only been got rid of by regularly cutting the stems when about 3 in. long, during three or four years. Some years ago one patch at Compton Downs, near Mount Gambier, about a rod in circumference, defied all efforts to exterminate it for about five years. The soil was trenched and sifted to get out all roots; but this failed, and it spread in a much larger circle. Then a deep trench was dug around the patch; holes were punched into the

soil with a crowbar a foot deep and a foot apart, and these were filled with a solution of arsenate of soda, which was also sprinkled liberally over the whole surface. Three hundred pounds of this "scrub exterminator" were used, but the thistle seemed to thrive upon it. From the first, the members of the Mount Gambier Branch Agricultural Bureau kept the plant mowed regularly before it flowered, and finally they succeeded in exterminating it. By preventing the development of leaves for a sufficient time any plant can be killed.

"Cnicus arvensis"—Canada Thistle.

Fig. 1.—Flower and seed-heads. Fig. 2.—Leaf (separated). Fig. 3.—Root, showing creeping habit and the manner in which stems are produced at short intervals. All greatly reduced.

Xanthium spinosum (Bathurst Burr).—This plant causes much damage to the wool of sheep through the burrs becoming entangled in it. It is estimated that wool in some parts is depreciated at least 3d. per lb. by the presence of the burrs. It is a shrubby annual, from 1 ft. to 3 ft. high; the under side of leaves and the stem are whitish; each joint of the stem is covered with sharp spines in groups of three. Leaves, lance-shaped, three-cut, the central lobe being much longer than the others.

The flowers are very small, greenish-yellow, in clusters at the base of the leaves, and these are succeeded by the hard oval burrs which enclose the seeds.

"XANTHIUM SPINOSUM"—BATHURST BURR.

Fig. 1.—End of a branch. Fig. 2—Leaf. Fig. 3.—Burr, showing hooked prickles. All of natural size.

CIRSIUM ACAULE (STEMLESS HORSE THISTLE).—This plant belongs to a genus of thistles comprising above eighty species, many of which are cultivated in gardens. This particular species has also been named *Cnicus acarna* and *Carlina acarna*. It is a pretty evergreen herbaceous perennial, prostrate, or growing close to the ground, the leaves spreading over the soil from a centre, in the heart of which the large purple thistle flowers are produced. This, and also many others of the genus, has been cultivated in gardens for the sake of its large "crumpled," whitish downy leaves, which are thickly armed on the edges with longish sharp

"Cirsium acaule"—Stemless Horse Thistle.

"HOMERIA COLLINA, *var.* MINIATA"—CAPE TULIP. About one-third natural size.

spines. The flower-heads are very large, some curved into the form of a horseshoe, armed with numerous spines, and with no stem whatever — proceeding directly from the crown. The Stemless Horse Thistle will grow on almost any soil, from dry limestone to the richest garden land. It was introduced to South Australia quite as early as 1845, appearing first on the Adelaide park-lands. For a very long time it made no progress, but latterly has spread by means of its winged seeds to all parts, so that it was deemed to be necessary to have it declared a noxious weed within the meaning of the Act. Stock of all kinds refuse to touch it unless driven to do so by starvation. The illustration shows a little over one-half of a very small plant, which was about 20 in. across. Some of the largest of them will spread over a radius of 40 in. or more.

HOMERIA COLLINA is commonly called "Cape Tulip." The illustration shows the plant at about one-third natural size. When mature, the flowering-stalk will sometimes reach a height of 30 in. to 36 in., and the lower leaves 20 in. to 24 in. in length and $\frac{1}{2}$ in. to $\frac{3}{4}$ in. broad. Usually the growth is not so strong as this, and in dry seasons or inferior soil will be considerably less. The long lower leaves are usually procumbent, the bulb is about $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. across at the base, and is covered with a dark greyish-brown fibre, beneath which hundreds of small bulbs, or bulbils, are found. Similar bulbils are also found on the stem. The character of the flower-stalk and the flowers is well depicted in our illustration, though usually only two or three flowers are carried on the stem. These are about 1 in. to $1\frac{1}{2}$ in. across, orange-yellow in colour at the tip and fading off towards the centre; at the base the petal is yellow, with some faint green markings. The petals are very delicate, and quickly fade. The Cape Tulip is known in many parts of South Australia. It is frequently found south of Adelaide and as far north as Clare. Around Adelaide it has spread to an alarming extent, and there can be no question that the grazing value of land in many places has seriously deteriorated in consequence. In many cases of deaths of cattle in districts where the Cape Tulip flourishes, there is no doubt that the animals have been poisoned by eating this plant. Stock apparently find out early that the plant is unsuitable for food, but strange stock generally pay the penalty of their inexperience. The eradication of the *Homeria* is attended with many difficulties, but the plan that is most successful is to continuously cultivate the land.

FALSE CAPER has been gazetted as *Euphorbia lathyris*, whereas it is really *Euphorbia terracina*. It is a small, shrubby, annual plant belonging to the spurge or milkwort family; a native of the Mediterranean regions, and doubtless introduced as a garden plant. This plant has for a number of years been growing practically unchecked along the inner face of the coast sandhills and the adjacent sandy soils midway between Brighton and Glenelg. Considerable areas of land are now covered with

it, and it appears to be spreading steadily over the grazing-lands adjacent. Ordinary cultivation destroys the plant. Like the other members of this family, *Euphorbia terracina* contains a milky, acrid juice, which exudes freely when the skin is injured. Most of these spurges possess poisonous properties, and the juice is reputed to cause festering sores if it comes in contact with the flesh. No stock appears to touch this plant, and we have never heard of any being injured by it. *Euphorbia terracina* usually grows into a small bush 1½ to 2 ft. in height; but in moist places, and where it is

"EUPHORBIA TERRACINA"—FALSE CAPER.

not overcrowded, it not infrequently reaches a height of 3 ft. 6 in. The leaves on the main stem are from 1½ in. to 2½ in. long by about ⅜ in. wide, and somewhat blunt at the end, while the leaves on the flowering branchlets are short, broad, and usually somewhat heart-shaped. The flowers are quite inconspicuous, being small and greenish-yellow in colour. In its early stages the leaves are pale green, and the lower part of the stem shows a crimson-pink tinge. As the plant matures, the leaves assume a buff, or straw, colour, and the stems and branches show a marked development of the crimson shade.

"Gomphocarpus fruticosus" (Wild Cotton).—This is a shrubby plant growing to a height of 4 ft. or more, and covering a considerable area of ground. The leaves are large and of a dull-green colour, with rather prominent white veinings. The flowers are somewhat similar to, and borne in bunches like the well-known ornamental *Hoya*, but are smaller. The large seed-vessels are of peculiar shape, and when mature are full of white filaments, which give the plant the popular name of Wild Cotton or Cottonbush. When the leaves or branches are broken,

"Gomphocarpus fruticosus"—Wild Cotton.

a thick white fluid is exuded from the injured parts. The Wild Cotton has been occupying considerable areas of land about Waterfall Gully, Burnside, and the neighbouring hillslopes for a number of years. It also grows freely on land adjoining the small creeks draining the hills about Burnside, and of late years small patches have been seen in several districts in the South. This plant, which is a native of the Cape of Good Hope, is reputed to possess injurious properties, but it is usually left untouched by stock. The chief objection to it is that it takes possession of valuable land to the exclusion of useful herbage.

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ERNEST R. PITT,
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Poultry Manual, by D. F. Laurie, 6d.; posted, 7d.

Vinegrowers' Manual, by A. Sutherland, 6d.; posted, 7d.

Report of Conference of Australasian Fruitgrowers, Brisbane, 1s.; posted, 1s. 3d.

Report of Conference of Australasian Fruitgrowers, Wellington, 1s.; posted, 1s. 3d.

Journal of Department of Agriculture of South Australia, 3d. per copy; 1s. per annum; back issues, 2s. 6d. per dozen.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agricultural Miscellaneous: Notes on South Australian Milling Wheats; Effect of Formalin and Bluestone on the Germination of Seed-wheat; Milling Characteristics of Australian Wheats; Semi-arid America—Its Climate Compared with that of South Australia; Agricultural College, Roseworthy—Harvest Reports; Agricultural College, Roseworthy—Reports on Permanent Experiment Field; Value and Aims of Plant Pathology; Rust-resistant Wheats; Reports on Agricultural Experiments; Noxious Weeds; The South Australian Wheat Yield, season 1907-8.

Chemistry and Soils: Soil Surveys; Available Plant Food in Soil.

Horticulture—Gardening: Select List of Fruit-trees; Preserving, Canning, and Drying Fruits; Fruit-preserving for Domestic Supplies; Plums and Prunes — Methods of Cultivation and Drying; The Lemon in Sicily; Notes on the Olive; Defects in Export Apples; Apple Mussel Scale, or Oystershell-bark Louse; Curculio Beetle; Valuable Grape for Export; Cider-making; Some Notes on Almonds; Production of Early Tomatoes; When to Apply Bordeaux Mixture; Fertilization of Orchard Lands; Fruit Flies; Fruit-maggot-fly Pests; The Codlin Moth.

Stock: Suggestions to Enquirers *re* Stock Complaints; Anthrax; Influenza and Strangles in Horses; Cattle Complaints ("Dry Bible"); Stomach and Bowel Disorders of the Horse; Pig-breeding and Bacon-curing; Roseworthy Agricultural College Farm Flock in 1906-7; Worms in Horses—How to Destroy.

Poultry: Chicken-pox and Roup in Poultry; Housing Poultry.

Dairying: Milk-testing with Babcock Tester; The Dairy Cow; Taints and Flavours in Dairy Produce; Milk- and Butter-production; Milking of Cows; List of Dairy Factories; Experiments in the Hand-feeding of Cows; Instructions for Milk and Cream Suppliers.